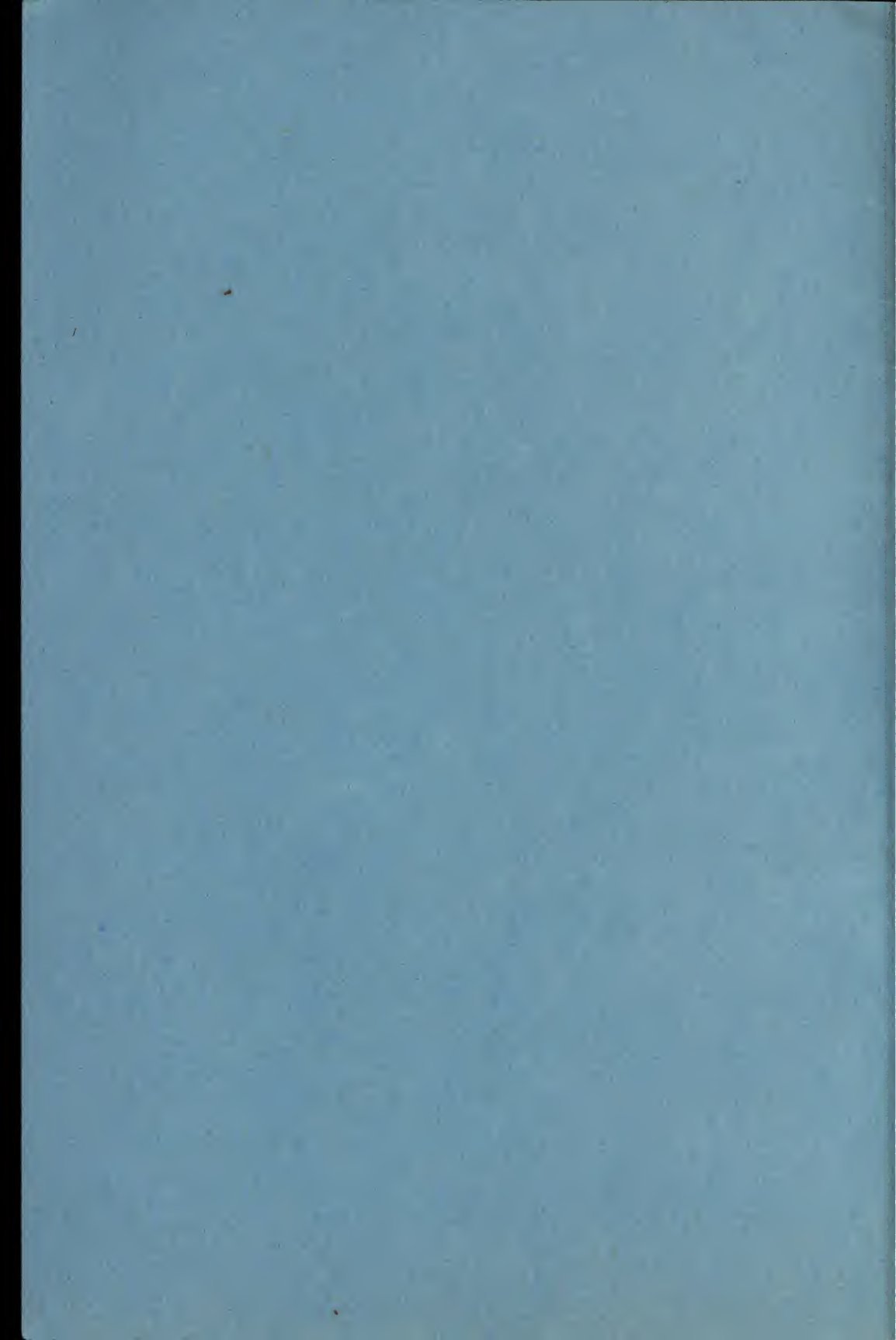


Recommended Practice of
HOME LIGHTING



Illuminating Engineering Society

51 MADISON AVENUE . . . NEW YORK



RECOMMENDED PRACTICE
of
HOME LIGHTING



Prepared by
SUB-COMMITTEE ON RECOMMENDED PRACTICE OF THE
COMMITTEE ON RESIDENCE LIGHTING
OF THE
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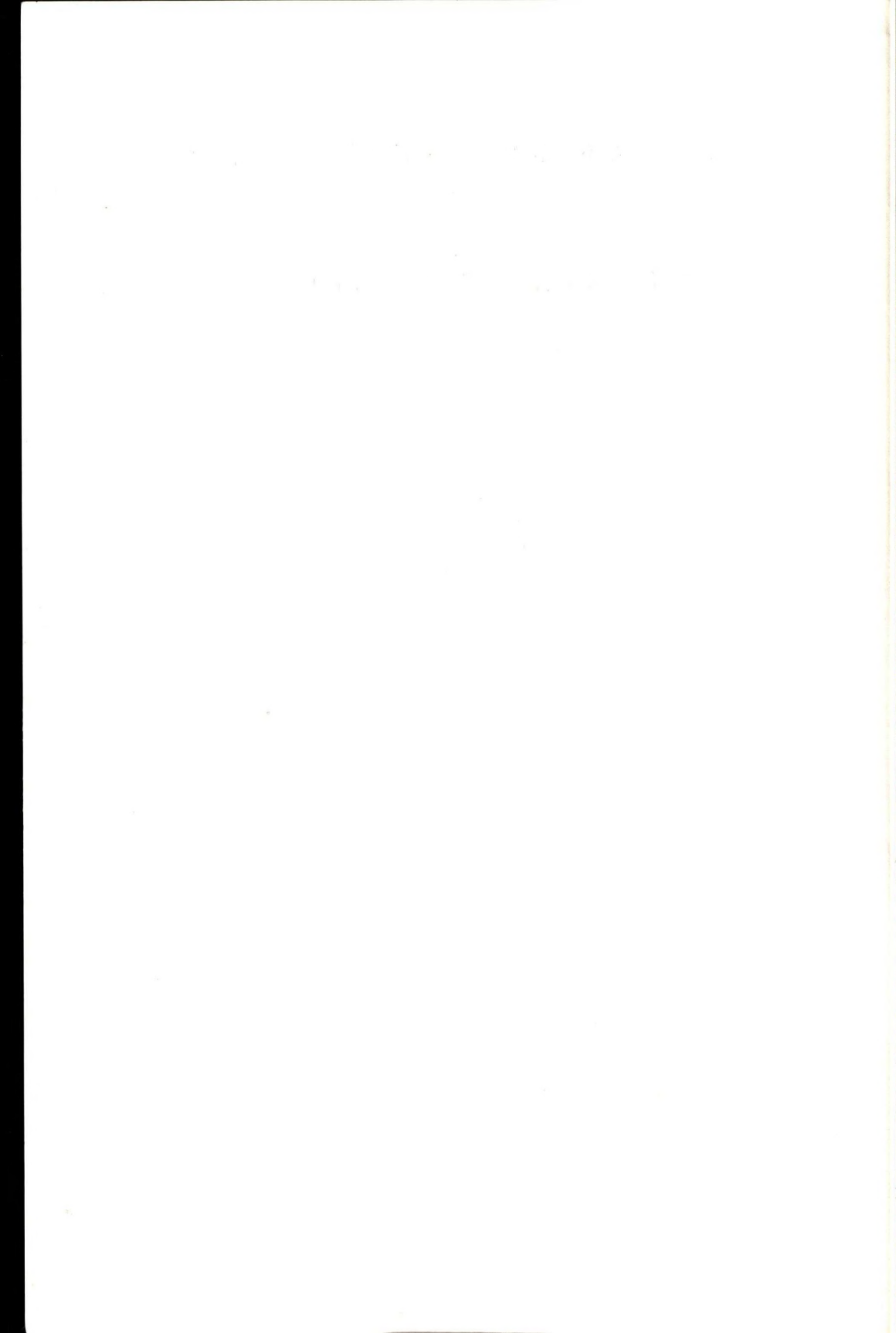
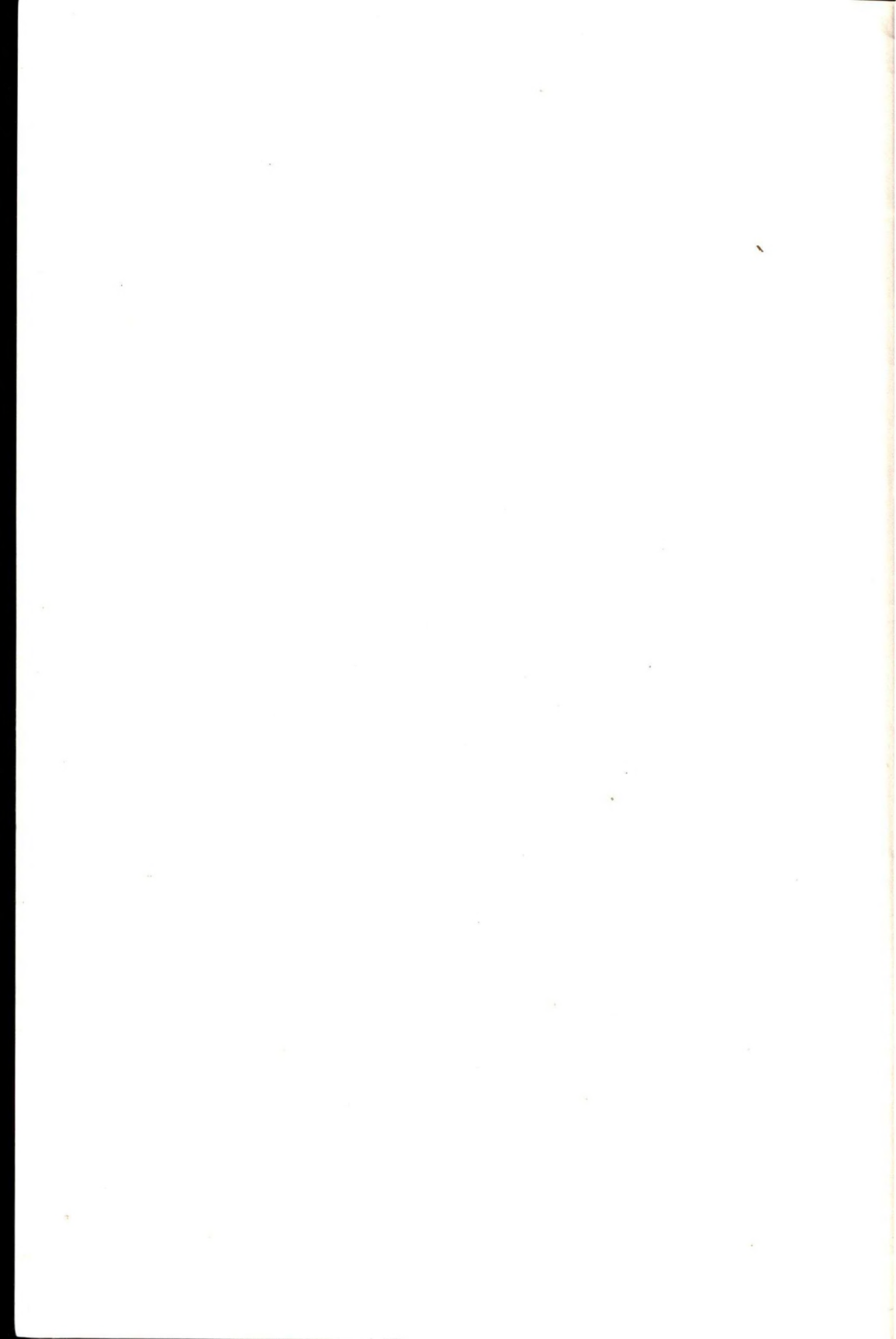


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Recommended Practice of Home Lighting

Prepared by the Committee on Residence Lighting of
the Illuminating Engineering Society

PART I—INTRODUCTION

OVER the past thirty years the Illuminating Engineering Society has been developing a series of lighting practice recommendations, covering a wide range of industries and applications. This Recommended Practice of Home Lighting is the first such lighting recommendation for the home—covering what is probably the largest lighting application and the one common to the greatest number of people.

In home lighting, unlike other lighting applications, individual tastes and esthetic considerations are of great importance. Because of the emphasis on individual preference in design and effects, it is perhaps natural to overlook the fundamental requirement of the home's lighting—that of safe, easy, and comfortable seeing. This Recommended Practice has attempted to assemble authoritative information on the subject.

It must be emphasized that much of the equipment illustrated is not available at the moment of publication due to problems of manufacturing reconversion, but the illustrations should be considered as examples of good practice. The release of materials and production facilities following the war will bring many changes in light sources and equipment types. Such changes will have some effect on lighting practice which will be treated in future revisions of this Recommended Practice.

PART II—THE OBJECTIVES OF GOOD LIGHTING

Data accumulated in recent years by painstaking laboratory research and through experience in application of light, have demonstrated conclusively that there is an inseparable relationship between light and vision. It is obvious that even eyes with perfect vision cannot function in total darkness. It is less obvious that in the wide range between total darkness and the ideal lighting system, there exists a region where only partially effective seeing can take place. The knowledge now at hand, established through years of study and experimentation, proves that upon the quantity of light and quality of lighting depends the ability to see clearly and quickly and with the least strain on eyesight, energy and general well being. Even life and limb may sometimes be the price of poor lighting as evidenced by thousands of accidents each year caused by falls in dark corridors and stairways. The

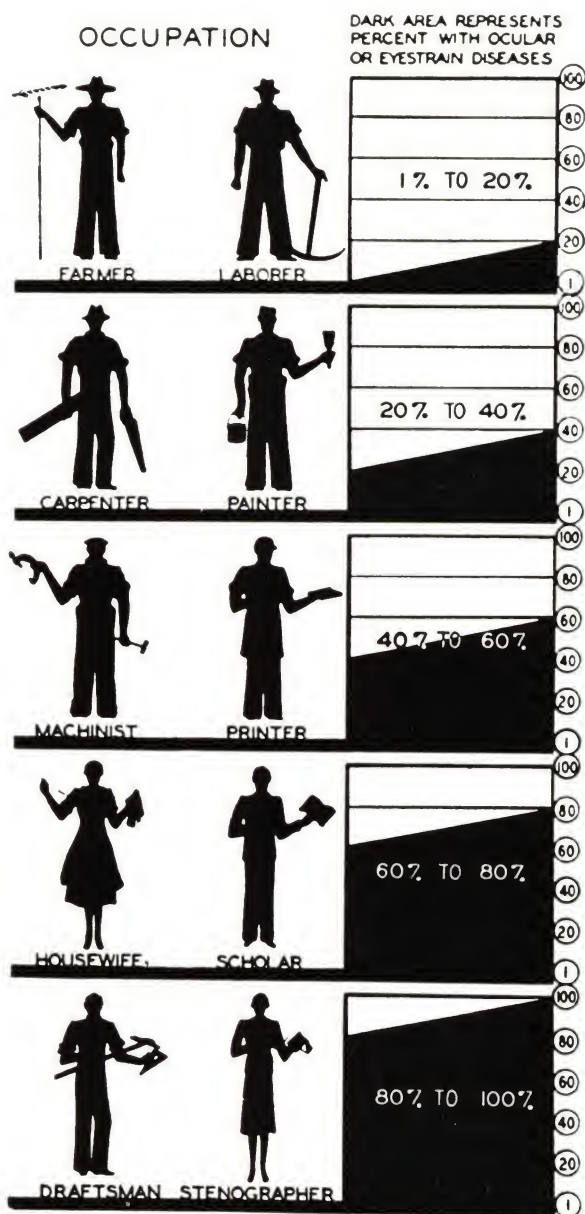


FIG. 1—This chart shows the greater prevalence of eye defectiveness in occupations involving prolonged near-vision activities.



FIG. 2.—This white-lined sphere is used to determine the effect of varying lighting ratios between the eye work and its surroundings. Many similar laboratory experiments have established the partnership of lighting and seeing.

process of seeing is accomplished not by the eyes alone, but by the whole body, in quite the same way that lifting a weight is not a task for the arms or back alone, but also has telling effect upon the heart, lungs and whole nerve fibre.

To the obvious *value* of clear and easy seeing has been added knowledge of the subtle costs of poor seeing to human beings. The high percentage of defective vision is one incontestable example, especially so since statistics show the greatest eyesight deficiency is found among those persons who live predominantly indoors and use their eyes for close work long periods of time. (See Fig. 1).

With the growing understanding of a lighting practice that alleviates unnecessary eye and nervous strain, the lighting of any interior must be planned both *objectively in terms of attaining good visibility of seeing tasks and subjectively in terms of human comfort*. Although the lighting of the home does not have the rigid requirements of the factory, school, or office where concentrating eye work goes on continuously and where individual taste is a less controlling factor, it should nonetheless be guided by the visual needs of the family. It is recognized, of course, that the lighting of the home must be so coordinated with the architectural detail and decorative scheme as to blend inconspicuously with it and give it added emphasis and interest at night.

TABLE I—ILLUMINATION VALUES FOR THE HOME

In the first section of the table entitled "Specific Visual Tasks," the illumination values given aim to fit the light to typical home tasks for persons with normal vision, with due consideration to such matters as cost and practical attainability. The values do *not* represent the optimum since under some conditions more light may be necessary, desirable, and often attainable. Such specific lighting may be obtained from portable lamps or from special purpose equipment designed for a specific function.

In the second section, illumination values are set forth for general lighting. These are intended to minimize undue brightness ratios between the illuminated visual tasks and their surroundings. In these places where close visual application is not involved, the values listed aim to assure certain and safe passage and lighting atmosphere for eye comfort and charm.

The values listed may be attained by fixtures, by portable lamps, or a combination of the two.

Specific Visual Tasks ¹	Footcandles Current Recommended Practice
Reading	
Prolonged periods (smaller type).....	40
Casual periods (larger type).....	20
Sewing	
On dark goods, fine needlework.....	100 or more
Average sewing (prolonged).....	40
Average sewing (periodic).....	20
Writing.....	20
Children's study table ²	40
Game Tables	
Card table.....	10
Ping-pong.....	40
Kitchen	
Work counter, range and sink.....	40

Dressing Table Mirror ³	20
Bathroom Mirror ³	40
Laundry Ironer, ironing board or tubs.....	40
Workbench.....	40
General Lighting	
Entrance hall, stairways and stair landings.....	5
Living room, library, sunroom.....	5
Dining room ²	5
Kitchen.....	10
Bedroom.....	5
Bathroom.....	5

¹ The values listed for specific visual tasks are an average of a number of readings measured with a footcandle meter placed on the work surface with the light-sensitive cell on the same plane as the work. The values listed for General Lighting represent an average of a number of readings taken throughout the room on a plane 30 inches above the floor, with the light-sensitive cell held in a horizontal position.

² Where dining table is also used for home study by children or for other critical eye tasks, illumination specified for that task should be furnished.

³ Lighting values to be delivered on both sides of face.

PART III—THE ESSENTIALS OF GOOD LIGHTING

In planning the home's lighting to meet the above objectives, there are three broad considerations: (1) The attainment of the prescribed amounts of light suited to the many specific eye activities common to the home. (2) The provision of a quality of lighting result that insures comfort and satisfaction for the occupants. (3) The understanding of the interrelationship of light source color and the wide range of colors in interiors. (These three essentials are more fully described in the following sections.)

1. Quantity of Light

It is known through scientific research that varied seeing tasks in the home require different amounts of light so that these tasks, varying in visibility, may be equally easy to see. Adherence to the lamp bulb sizes indicated for fixture and portable lamp types discussed in Part IV will, when used in proper combinations, insure the footcandle values listed in Table I.

2. Quality of Lighting

To insure comfort in the use of the specified amounts of light on seeing tasks, it is essential that the resultant brightness on the tasks be not greatly in excess of the background against which they are viewed. This requires such careful distribution of the light within a room that the room is free from glaring bright spots and deep shadows. Glare is too often associated with unshaded lamp bulbs. As a matter of fact shaded fixtures and portable lamps may also be sources of discomfort if their shading media—glass, plastic, parchment, fabric, or such is too transparent to diffuse the light or if they are greatly brighter than the surface against which they are viewed. A common example is a white translucent shade against a dark wood paneled or dark painted wall.

Extreme brightness ratios can be overcome—or low brightness-ratios attained—in general, by distributing the light more widely throughout a room. This can be accomplished by the selection of low-brightness fixtures, lamps, and/or built-in units which direct some light to the ceiling and walls. See Fig. 3. (It is to be noted that center lighting units of small dimension which are recessed in the ceiling cannot by themselves provide comfortable or satisfactory room lighting.) It is wise to judge lighting equipment with its recommended wattage under night-time conditions to determine whether or not it is going to be uncomfortable to "look at." Relatively low-brightness fixtures and lamps are particularly important in living rooms, dining rooms, and bedrooms. In these rooms persons often spend many hours in seated positions which may bring the fixture and lamps within their view. Higher brightness, on the other hand, is acceptable for fixtures in the smaller size utility rooms—kitchen, laundry, halls, and bath—in which persons are occupied with activities which do not ordinarily allow the direct viewing of the fixture.



FIG. 3—In the lower illustration, general lighting from other equipment about the room makes the interior more pleasant decoratively and reduces extremes in brightness which are so apparent in the top photograph.

It is not being suggested that a room be illuminated so that all pleasing shadow and contrast are eliminated. Such a room would be as unattractive as a painting without some subtle shadows. However, when large areas are in deep shadow and there is great apparent difference between the amount of light on the task and on its surroundings the resultant effect is the cause of unnecessary eyestrain and fatigue.

Light Distribution

Since the line sketches of recommended types of fixtures shown in Part IV cannot show the manner in which the luminaire distributes its lighting in the room (one very important factor for suitable fixture selection) the illustrations in Fig. 4 will clarify the terminology used to identify the types.

Types 1 and 2 (direct and semi-direct) emit light entirely or in highest percentage downward, providing the highest footcandles per watt over areas beneath, but usually create varying density of shadow and harshness of result. Used for highlighting confined areas, as over dining tables, the result is often most desirable and dramatic.

Type 3 (general diffuse lighting) emits light in fairly equal proportions in all directions or upward and downward. With a fixture that provides general diffuse lighting, usually of the diffusing glass globe style, some difficulty may be experienced unless it is out of the general visual field and unless it is in close brightness relationship with its surrounds. It is generally most applicable to relatively small utility spaces.

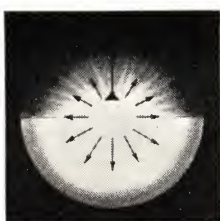
Types 4 and 5 (semi-indirect and indirect lighting) emit light in highest percentage or entirely upward to ceiling for redirection, providing less footcandles per watt in the center of the room, but resultant illumination spread over a larger area is characterized by greater softness and less shadow. Used alone in a room, the result lacks definition, depth, and sparkle. Although best results are obtained when the fixture is suspended a foot or more below the ceiling, common low ceilings often dictate a compromise between best efficiency and appearance by hanging so that the top of the lighted part of the fixture is four to six inches below the ceiling. Shallow rather than deep bowl forms are preferred in order to distribute the light more advantageously.

Light Controlling Materials

The over-all effectiveness and pleasing appearance of lighted elements in the home depend on the light controlling material. Efficient reflecting materials are, for example, mat white paint, porcelain enamel, or etched aluminum. Luminous areas with nearly uniform brightness require highly diffusing materials, such as opal and enameled glasses, plastics, or



(1) Direct lighting.



(2) Semi-Direct lighting.



(3) General Diffuse lighting.



(4) Semi-Indirect lighting.



(5) Indirect lighting.

FIG. 4—Classifications of lighting systems.

treated fabrics. It should be noted that less diffusing material, such as etched glass, may be used satisfactorily with fluorescent lamps because of their lower intrinsic brightness. A number of light-controlling materials, which were found impractical with filament lamps become applicable with fluorescent due to their lower heat radiation.

3. The Effect of Amount of Light and Color Characteristics of Light on Room Colors

The effectiveness of quantity of light within a room is greatly dependent upon the reflective qualities of the walls and ceiling. Different colors reflect different amounts of the light. Generally speaking, a room is more satisfyingly lighted when the ceiling, floor and walls reflect light in the following percentages: ceilings between 65 and 80 per cent; floors between 10 and 20 per cent; and walls between 35 and 55 per cent. In utility rooms where efficiency is of greater importance the higher values are better. Lower values are permissible, though not desirable, in rooms where decorative treatment is of paramount interest and critical seeing is not involved.

Today the paint industry offers a considerable choice of colors in various tints and shades that will add decoration value and at the same time reflect a large percentage of the light. Colors are grayed and tend to lose their vibrance and true hue in too dimly lighted rooms.

TABLE II—REFLECTION FACTORS OF TYPICAL PAINT, PAPER, AND WOOD FINISHES FOR INTERIORS

Color	Per Cent of Light Reflected
White.....	85
Light	
Cream.....	75
Gray.....	75
Yellow.....	75
Buff.....	70
Green.....	65
Blue.....	55
Medium	
Yellow.....	65
Buff.....	63
Gray.....	55
Green.....	52
Blue.....	35
Dark	
Gray.....	30
Red.....	13
Brown.....	10
Blue.....	8
Green.....	7
Wood Finish	
Maple.....	42
Satinwood.....	34
English Oak.....	17
Walnut.....	16
Mahogany.....	12

The type and texture of the paint used is also important. As a general rule, the wall and ceiling surfaces should be *mat* and not gloss. A mat finish spreads or diffuses the light in all directions. A gloss surface intensifies and even mirrors any shortcomings of the lighting installation.

Table II lists the approximate percentage of light reflected by typical colors and finishes used in home interiors.

Color Effects of Filament and Fluorescent Light Sources

One very important difference between the two most applicable home light sources—filament and fluorescent—is in their effect on color. The white fluorescent lamp emits a greater proportion of blue and green light than does

the filament lamp, thus tending to emphasize blue, green, and yellow in interior colors and to tone down red and orange. The filament lamp emits a greater proportion of red and yellow light, thus emphasizing red and yellow and toning down blue and green. It is anticipated that continuing developments in fluorescent sources will include lamps that will modify these differences.

With either source, strong, deep colors in the luminous parts of fixtures and portables are to be avoided, although pale tints are permissible.

Colored light is usually undesirable for critical seeing, but may be desired for special decorative effects. Colored light is obtained from colored filament or fluorescent lamps or by placing colored glass or gelatins over white lamps.

PART IV—LIGHTING RECOMMENDATIONS FOR THE MAJOR ROOMS OF THE HOME

On the following pages are discussed the usual lighting needs of each major room of the average home. The general form, light distribution, minimum sizes and wattages indicated in the descriptive copy keyed to each sketch, should be adhered to, although of course decorative detail is entirely a matter of taste and market supply. *Admittedly the minimum limits given for size and wattage are somewhat arbitrary, but they offer a helpful and reliable prescription.*

Entrances, Halls and Closets (Fig. 5)

Architectural treatment dictates placement and type of entrance lights. Brackets, that provide downlight on steps (such as shown in "A" of Fig. 5) are preferably placed at each side of the door. Often a single bracket above the door harmonizes better with the architectural design but prevents seeing clearly the face of the caller. With an attached porch, a suspended lantern (B) should be placed on the porch ceiling so that the steps are safely lighted. Clear glass panels in brackets or in a lantern should be avoided, since lighted bulbs behind clear glass proves more blinding than helpful. When a doorway is slightly recessed, a light box (60-100 watts) may be inconspicuously inset in the soffit above with effective result. Use of a 150-watt Projector Floodlamp (H) or a 100-watt lamp in an angle reflector, switch-controlled from within the house, set under the eaves will provide ample protective lighting between the garage and house as well as yard or garden lighting.

A lighted house number may be incorporated in the entrance lantern, in a separate recessed box (C) located in the house wall or steps, or in a special applied box tied in with the door-bell circuit (D). The size of numerals is important; for clear visibility up to 75 feet, they must be three inches high with a half-inch stroke.

Halls with open stairways often suggest lantern types (E), their scale and ornateness fitting the interior and placed to assure safe light on the stairs. Type (F) must be mounted close to the ceiling to avoid seeing the bulbs when descending stairs. In smaller halls Type (G) may be used, and for vestibules and narrow passages the same type in smaller sizes down to 6 inches in diameter and 40 watts are possible.

A light is essential in a closet unless it is less than 9 square feet, or not more than 18 inches in depth, or where the light from an adjacent room is sufficient. When closets are located in hallways it is often practical to place the hall fixture in relation to the closet. A simple porcelain pull-chain socket mounted inside and just over the door frame on the opening side serves shallow closets. Deeper closets are better served by a fixture, G-type in smaller sizes, on the ceiling, controlled by switch just inside the door or by an automatic switch which operates by opening and closing the door. A minimum of 60 watts is recommended.

Living Rooms (Fig. 6)

In living room lighting a degree of flexibility is desirable to meet the varied requirements of family living. This is provided by:

1. *Ceiling Fixture*

A ceiling center fixture similar to types shown provides most practically, at least for the modest home, (1) soft background lighting for more visually comfortable use of portable lamps, (2) lighting for game tables in center of room without need to move portables, (3) convenient overall room light upon entering, and (4) flexibility in the room's atmosphere for varying occasions. The recommended types (Fig. 6) distribute light to the ceiling and side walls and diffuse downward light throughout the room. The minimum sizes indicated for A and C will be effective only for small rooms of 150-200 square feet or less. As fixtures increase in size and are hung close to the ceiling, they become less conspicuous. Generally a fixture should be hung not less than 7 feet 6 inches above the floor; on ceilings over 9 feet suspended types shown as C and D in Fig. 6 afford more generous light distribution.

2. *Wall Brackets and Urns*

Wall brackets and urns of either the purely decorative or functional types have living room application. Type E wall urns illustrated in Fig. 6 (functional) used in pairs on opposite walls offer substantial additional lighting to the general illumination of a room especially in low-ceiling rooms and on the end walls of a long narrow room in which a central fixture lights side walls better than end walls. Types F are more suited to purely decorative



FIG. 5—Recommended fixtures types for entrances, halls and closets.

- | | | | |
|--|--|---|---|
| A—Lantern bracket. Filament. Min. watts—40. Min. diam.—6 inches. | B—Ceiling lantern. Filament. Min. watts—40. Min. diam.—6 inches. | C—Recessed house number. Filament. 3 to 7 watts. | D—Attached house number. Filament. Special voltage lamp (for doorbell circuit). |
| E—General diffuse lantern. Filament. Min. watts—60. Min. diam.—8 inches. | F—Semi-indirect. Filament. Min. watts—80. Min. diam.—12 inches. | G—Semi-direct. Filament. Min. watts—80. Min. diam.—12 inches. | H—Projector Lamp Fixture. Filament. 150-w projector flood lamp. |



FIG. 6—Recommended fixture types for the living room.

A—Semi-indirect close ceiling. Filament. Min. watts—150. Fluor. circular—Min. watts—*50-60. Min. diam. 15 inches.

D—Multiple-arm, semi-indirect. Close or suspended from ceiling. Filament. Min. watts—40 per bowl. Min. diam. each bowl—5 inches.

G—Recessed directional side wall lighting. Filament tubular lamp—20-40 watts per running foot. Fluorescent—10 watts* per running foot (special reflector contours for more light and best wall distribution).

B—Semi-indirect close ceiling. Fluorescent. Min. watts*—80. Tube determines dimensions; can be round, square, oblong to suit room dimensions.

E—Wall urn. Filament. Semi- or totally indirect. Min. watts—60.

H—Lighted cornice over windows. Filament tubular lamps—20-40 watts per running foot. Fluorescent—10 watts* per running foot.

C—Semi-indirect suspended. Filament. Min. watts—150. Fluor. circular—Min. watts *50-60. Min. diam.—15 inches.

F—Decorative wall bracket. Filament. Min. watts—15. Single arm—25.

I—Dropped valances for side-wall lighting. Filament tubular lamps—20-40 watts per running foot. Fluorescent—10 watts* per running foot.

* Wattage recommendations are lamp bulb wattage only.

highlighting. In normal height rooms they are mounted 5 feet 6 inches above the floor and are best placed near casements to preserve wall spaces for logical furniture and picture placement. The functional type may, of course, be decorative.

3. *Built-In Lighting*

When cost is not a limiting factor, skilfully applied and balanced, built-in lighting (G, H, and I of Fig. 6) offers endless possibilities and may replace a center fixture for similar lighting results or augment it for unusual decorative effects. The simplest methods are shown. An indirect or luminous cove, continuous or sectional, is not suggested for other than effect unless it can be mounted at least one foot from the ceiling and use directional reflectors for more satisfactory light distribution. (See illustration "I" in dining room section.)

4. *Table and Floor Lamps*

To insure desirable amounts of light for sewing, reading, and other seeing tasks, the light source should be not more than 30 inches distant except in those cases in which specially-designed in-built lighting is applied. Portable lamps prove the most flexible means of obtaining light at desks, davenport, reading and sewing chairs, and pianos. (See Fig. 11.) Portable lamp lighting proves more comfortable and less spotty when walls and floor are sufficiently lighted to avoid high brightness ratios between the immediate eye work and the surroundings.

Dining Room (Fig. 7)

Whether the dining table is set in a room of its own or at one end of the living room, it is still the center of interest for that area. Linen, china, and silver cannot gleam and sparkle if lighted by small wattage lamps in remote pairs of wall brackets. The method of lighting and the choice of fixtures, however, depend to a great degree on the activities at the dining room table. If it serves as just a dining area, individual taste is the dictator. If the dining table becomes a utility table for sewing, studying, writing or games, sparkle and gleam become secondary to enough well diffused light. The dining area, therefore, requires flexible lighting too. It can be provided by a choice or combination of ceiling fixture, brackets and built-in lighting. (See Fig. 7).

1. *Ceiling Fixtures*

When a fixture is suspended over the table it becomes part of the table grouping and is usually hung with the bottom of the fixture 30 inches to 36

inches above the table top. Fixtures A and D in Fig. 7 are designed so that a portion of the light is directed downward giving emphasis to the table and creating sparkle from the silver, china and crystal. When the dining table is to become a utility table after dinner, a fixture should be chosen that produces lighting with the downward light diffused by means of a glass or plastic reflector, such as used in Fixture B of Fig. 7.

When it is desired to have a fixture close to the ceiling as part of the ceiling treatment rather than a suspended unit, fixtures Type E and F are recommended. Types A and C may be hung without suspension. Close-to-ceiling fixtures, unless designed with a downlight component, will not high-light the table as well as a suspended unit.

2. *Wall Brackets*

Wall brackets add a pleasing note of decoration in the dining room and liven up walls with light. They are usually mounted 5 feet 6 inches above the floor and should be used in pairs. They should not, however, be used in place of a ceiling fixture but in conjunction with one. Because of the remote location of wall brackets they alone cannot produce the light desired to create dramatic emphasis on the table service. For suggested types of wall brackets see those illustrated for the living room.

3. *Built-In Lighting*

The dining room is adaptable to decorative lighting from window or wall valances, coves at opposite sides of the room, recessed pin-hole spots and lights in and above the china cabinets. Coves and valances may provide general illumination in place of a ceiling fixture, or they may be used with a fixture when it is primarily for decoration. The valance and cornice lighting illustrated for the living room is applicable to the dining room also. Lamps may be installed on the top of high china cabinets to give additional background lighting as well as being decorative. Downlights, similar to Type G of Fig. 7, that are recessed in the ceiling give dramatic emphasis on the table only. When downlights are installed over the table some additional lighting system to reduce contrast and provide background lighting is essential—wall brackets, torchieres, urns, valances or coves.

Kitchen, Laundry and Garage (Fig. 8)

Serviceable *kitchen* lighting means there must be: (1) light distributed generally about the room, and; (2) light specifically directed on work areas: sink, range, counters and dining table if there is one. Ceiling fixtures similar to Types A, B and C will provide general illumination. Totally indirect fixtures of Type B style should be suspended far enough from the ceiling to



FIG. 7—Recommended fixture types for the dining room.

A—Semi-indirect with down-lights. Filament. Min. watts—150. Additional circular optional—32 W*. Min. diam.—15 inches.

D—Shaded candle fixture. Filament. Min. watts—25 per candle. Min. shade diam—4 inches.

G—Direct spot lighting. Filament. Special equipment.

B—Semi-indirect with inner diffusing bowl. Filament. Min. watts, dinette—150 (3-lite). Min. diam. dinette—14 inches. Min. watts, dining room—300 (3-lite). Min. diam., dining room—18 inches.

E—Semi-indirect. Fluorescent. Min. watts,* dinette—60. Min. watts,* dining room—80.

H—Over cabinet lighting. Filament tubular lamps—20-40 watts per running foot. Fluorescent—10 watts* per running foot.

C—Multiple-arm, semi-indirect. Filament. Min. watts—40 per bowl. Min. bowl diam.—5 inches.

F—Semi-indirect close ceiling. Filament. Min. watts—150. Fluor. circular—Min. watts—50-60. Min. diam.—15 inches.

I—Cove lighting. Filament tubular lamps—20-40 watts per running foot. Fluorescent—10 watts* per running foot at opposite ends of room.

* Wattage recommendations are lamp bulb wattage only.

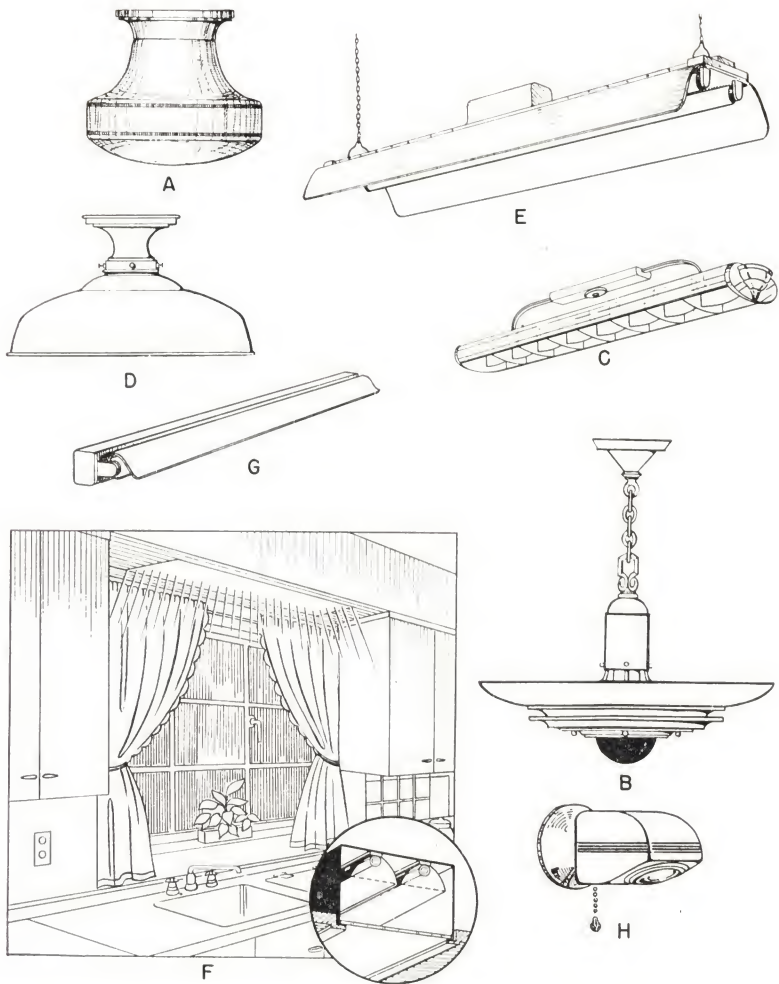


FIG. 8—Recommended fixture types for the kitchen, laundry and garage.

A—General diffuse enclosing globe. Filament. Min. watts—150. Min. globe diam.—12 inches.

D — Direct. Filament. (Silvered bowl bulb). Min. watts—150.

G — wall bracket. Fluorescent. Allow 10 watts* per running foot.

B—Totally indirect. Filament. (Silvered bowl bulb.) Min. watts—200. Min. diam.—14 inches.

E — Direct. Fluorescent. Min. watts*—40.

H — Wall bracket. Filament. Min. watts—60. Min. diam.—4 inches.

C—Semi-direct. Fluorescent. Min. watts*—80.

F—Recessed direct light. Filament or fluorescent. Min. watts—filament, 200; fluorescent,* 60. Min. size—8 inches x 25 inches.

* Wattage recommendations are lamp bulb wattage only.

permit a wide distribution of light but not so low as to expose the luminous neck of the lamp to one's eyes. General illumination alone will not prevent the annoyance and inconvenience of working in shadow at the sink, range, and other work areas.

The type of lighting installed over the sink depends upon the window and cabinet treatment. Fixtures such as Type C with 60 watts may be used over the sink. Direct downlight units similar to Type F may be recessed in a furred-down section between cabinets over the sink. Prismatic glass or lens plates should be used with filament lamps; stippled or finely etched plates or louvers with fluorescent lamps if tubes are visible from normal standing position. Satisfactory installations are often possible without louvers or bottom shields. In fact, with a deep Alzak parabolic reflector a single 30-watt tube with no shielding will produce the recommended level without discomfort. When sinks are against unbroken wall surfaces, a bracket similar to G may be attached to the wall or under shelf or cabinets. Brackets of the G type are suitable for use over work counters and the same type may be used over ranges. They should be mounted approximately 56 to 58 inches above the floor or below eye level for greatest comfort.

When lights are not built into cabinets to illuminate the counter surfaces, brackets similar to Type G of Fig. 8 should be installed on the wall under the cabinets.

Serviceable *laundry* lighting means there must be light directed on work areas such as: wash tubs, ironing board, ironer, and counters or sorting table. A single, conventional ceiling fixture cannot properly light these various areas. A minimum of two fixtures is necessary. Fixtures, similar to Types D and E, are recommended over laundry work areas and basement work benches.

In the *garage* two fixtures, Type D, are recommended—one mounted at the front and one at the rear, or as otherwise desired.

Bedrooms (Fig. 9)

Bedrooms in the home must fit today's living by being adaptable to other uses than that of a comfortable place to sleep. Dressing, applying make-up, reading, sewing, studying are common uses. A ceiling fixture is, therefore, recommended in every bedroom. Fixture types A, B, and D in Fig. 9, give similar lighting effect, the choice depending on individual preference. Type C is perhaps preferable in children's rooms since the fixture itself has no appreciable brightness and is thus most comfortable as viewed from reclining positions. The minimum sizes specified are for small and medium rooms; larger sizes would serve better in the unusually large bedroom.

The bedroom provides an excellent opportunity for the application of the less expensive built-in lighting effects. Special lighting devices at the

dressing table and pier mirror send the mirror-user to the day's assignment with assurance. For dressing tables built in between wardrobes, excellent make-up lighting is obtained by a light box (F) recessed in the furred-down ceiling above. Thin etched glass is recommended for fluorescent and diffusing opal for filament. The dresser top should be finely etched glass, with etched side mirrored for fullest lighting benefit.

Lighting down each side of the mirror is also excellent. It may be inset in the wall (G) or attached to it with half-cylinder shades (E). A bracket with an open-bottom oval shade (H) placed over the pier mirror offers a low-cost lighting method.

Wherever special built-in lighting is not supplied, portable lamps are needed. For the one who reads in bed, wall lamps hung over the bed give the most generous result, although tall bedside table lamps serve too. Lamps at the dresser, desk, reading or sewing chair are required. A small 6-watt night lamp plugged in a low convenience outlet is desirable, especially in nurseries.

Bathrooms

The most important lighting in the bathroom is that which is provided at the mirror. Light is needed at the bathroom mirror for both shaving and make-up. Shaving becomes a difficult task when the conventional fixture is placed directly over the mirror. Such an installation illuminates the glass and the top of one's head producing grotesque shadows under the eyes, nose and chin. Therefore, it is not the mirror that should be lighted but the face in front of it. The ideal mirror lighting method is light entirely around the mirror. This method seems not too far in the future. At present the best method is the installation of two brackets, one at each side of the mirror, mounted approximately 5 feet 6 inches from the floor. Either filament bulbs or fluorescent tubes may be used (types E or G in Fig. 10). The length of the fluorescent tube, however, provides more light distributed over the face and neck. All lights should be shaded as they are in direct line with one's eyes. There is one exception to this rule. The 15 and 20-watt fluorescent lamps ($1\frac{1}{2}$ inch diameter) spaced approximately 30 inches apart can be used unshaded. For added eye comfort and appearance even these two sources may be shaded.

Where the budget permits only one lighting outlet in the bathroom, an over-mirror fixture can be used provided it is so designed that the bulb or bulbs are shaded, such as Type F.

Unless a bathroom is very small (less than 60 square feet) it should have a ceiling fixture (A, B or C in Fig. 10). If a small budget necessitates a choice between a ceiling fixture and mirror lights, choose the mirror lights. Be sure either the ceiling fixture or mirror brackets are controlled by a switch

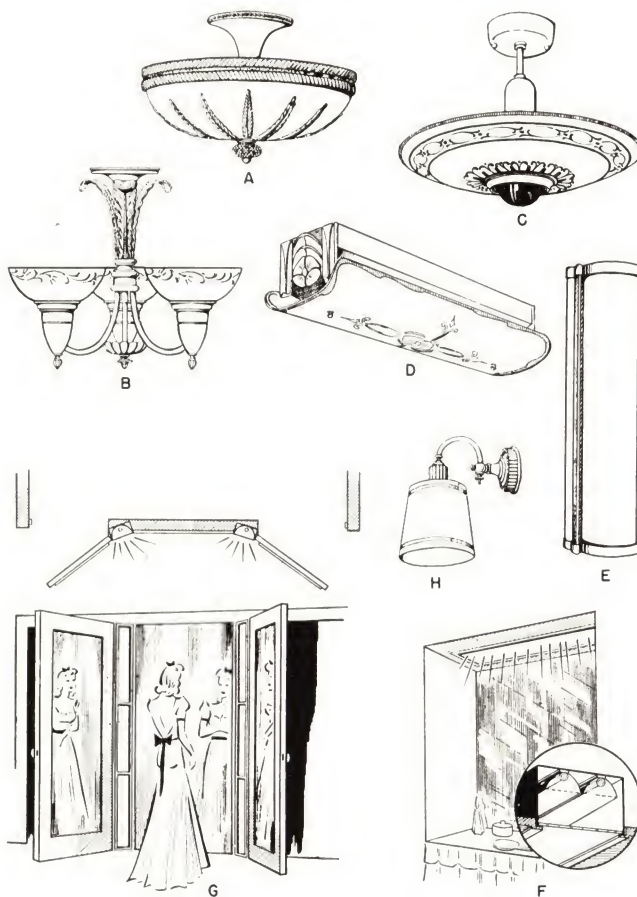


FIG. 9—Recommended fixtures types for the bedroom.

- A—Semi-indirect. Filament. Min. watts—120. Min. diam.—12 inches. Fluor. circular—32 watts*
- B—Semi-indirect multiple arm. Filament. Min. watts — each bowl 40. Min. diam. —each bowl 5 inches.
- C—Indirect. Filament (silvered bowl bulb). Min. watts—150. Min. diam.—14 inches.
- D — Semi - indirect. Fluorescent. Min. watts*—40.
- E—Bracket. Fluorescent. 20-40 watts*, depending on mirror length.
- F—Direct lighting, recessed box. Min. watts, filament—180; fluorescent—40.*
- G—Recessed box. Fluorescent. 10 watts* per running foot.
- H—Bracket for door mirrors. Filament. Min. shade size—10 inches long, 8 inches deep. Min. watts—100.

* Wattage recommendations are lamp bulb wattage only.

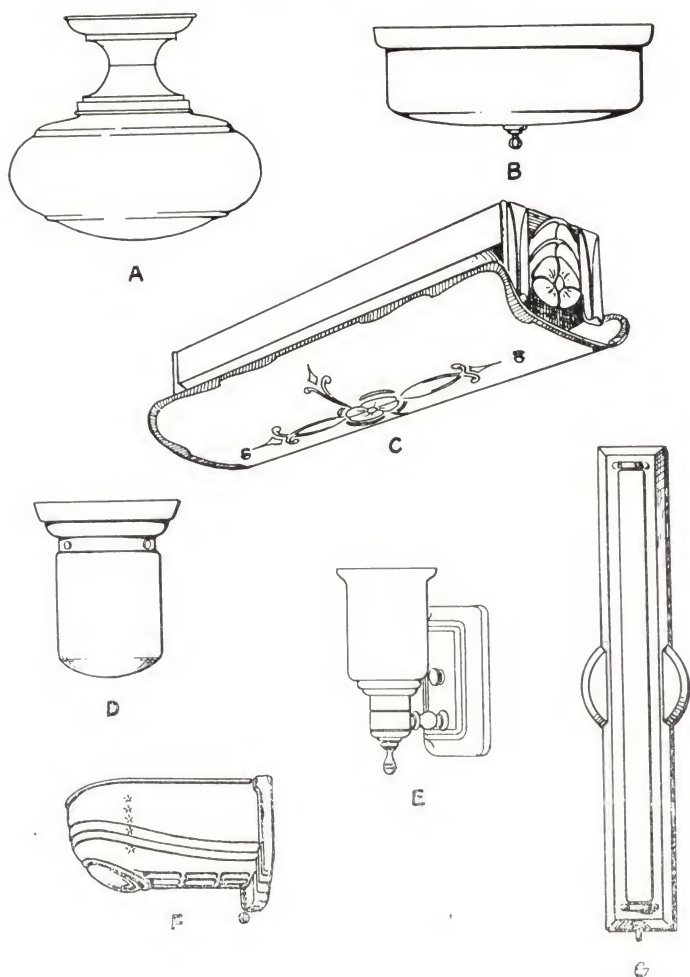


FIG. 10—Recommended fixture types for the bathroom.

- | | | | |
|--|--|--|---|
| A—General diffuse enclosing globe. Filament. Min. watts—100. Min. globe diam.—10 inches. | B—Semi-direct close ceiling. Filament. Min. watts — 120. Min. diam. — 12 inches. | C—Semi-direct close ceiling. Fluorescent. Min. watts*—30. | D — Vapor - proof shower light. Filament. Watts—60. |
| E — Semi-indirect bracket. Filament. Min. watts—60. Min. glass diam.—4 inches. | F—Semi-indirect bracket with lens light. Filament. Min. watts—100. | G — Wall bracket. Fluorescent. Min. watts*—15. Tube diam.—1½ inches. | |

* Wattage recommendations are lamp bulb wattage only.

inside the bathroom door. If there are two doors to the bathroom there should be a switch at each door entrance. This will eliminate the inconvenience of entering in darkness and groping for switches on the brackets.

Enclosed showers should have a vapor-proof ceiling light (D) controlled by a switch outside the compartment. In large bathrooms a fixture recessed over the tub is also a convenience. It should be switch controlled at the door.

For safety and convenience, a night light in the switch plate at the door, or one in the baseboard is recommended.

Floor, Table and Wall Lamps

It is possible through skillfully planned built-in forms combining efficient fluorescent and spotlight sources to develop satisfactory lighting throughout a home without the use of portable lamps. Such a plan requires relatively fixed positions for furniture, and its cost at present makes it impractical for *average* homes. Most homemakers still prefer the flexibility and decorative value of portable lamps. The ceiling fixtures illustrated on the preceding pages do not produce the required levels of lighting at furniture groupings for close eye work. Therefore, portable lamps are recommended.

Each portable lamp—be it a table, floor or wall type—should harmonize in scale, material, and form with its room environment and produce those levels of comfortable lighting, indicated in Table I, suited to the eye activity associated with the specific grouping for which it is selected. See Fig. 11.

The first certified lamps introduced to the home gave in service between 15 and 40 footcandles, but lamps giving the needed 50-100 for sewing and other fine detail tasks are anticipated through the effective use of the newer fluorescent sources (sometimes in combination with filament lamps.) Table III gives the range of required filament and fluorescent lamp wattages to meet these footcandle recommendations together with the dimensions for lamp heights and shade diameters which avoid wasteful choking of the light, while realizing a spread of light suitable to each furniture grouping. Some further points need emphasis for the satisfactory choice and use of lamps—vision-wise.

A. Inner Diffusing Bowls.

The first certified lamps on the market introduced diffusing bowls within the shades. Their purpose is to improve the quality of lighting for the more exacting eye tasks, to break up the harsh light inherent in 100-watt and larger filament lamps, to soften shadows, and to reduce reflections from shiny surfaces. This improvement in quality is not gained without some loss of light. The shape, size, and density of the bowls are important; certified ones are an insurance against unwarranted loss of light. Lamps under 24 inches tall for 25-26 inch tables require special bowls which bend



FIG. 11—Examples of wall, table, and floor lamps selected and placed correctly for decorative harmony and the seeing needs their grouping suggest.

TABLE III—GUIDE TO PORTABLE LAMPS AND BULB SIZES

	Total Bulb Wattage		Lamp Height Overall	Shade Diameter, Lower Edge
	Filament	(1) Fluorescent		
Lamps for flat top desks and tables	100-150	30-40	19-28" (2)	14-18"
Vanity lamps for:				
dressing tables	75-100	15-20	20"	8-10" (3)
dressers	75-100	15-20	26"	8-10" (3)
Wall lamps	75-100 100-150	15-40	50-60" above floor	8-10" (4) 12-18" (5)
Floor lamps	150-500	(6)	50-58" (2) (7) (8)	16-20" (9)

(1) Tube wattage only. Does not include current consumed by auxiliary, and refers only to straight tubes.

(2) Some models using fluorescent tubes may be shorter, since the tube's form and moderate brightness allow a lower positioning within the shade, with a resultant wider spread of light.

(3) In vanity and wall lamps utilizing straight fluorescent tubes full length shielding is required.

(4) This size appropriate only with 75-100 watt filament lamps (without diffusing bowls) over sinks and both sides of dressing table mirror.

(5) This size (with bowls) required for critical seeing, such as, for use over beds, desks, sewing machines, chairs, etc.

(6) Circular fluorescent lamps (usually 32-watt tubes) are being used as supplementary lighting in place of the customary candles.

(7) An adjustable feature is most desirable in floor lamps in order to fit the lamp most comfortably to the varying seating heights of lounge chairs and davenport.

(8) Totally or semi-indirect torchiers should be 60-66" high.

(9) The shades on small scale bridge lamps may be smaller, 10-14", since the extension arm brings the light closer to the user.

the light for greater spread (compensating for the lower height). For more casual seeing use, table lamps 19-24 inches high equipped with two adjustable sockets (using the smaller 60-watt bulbs) are satisfactory. Inner bowls of typical white diffusing materials should *never* be used in dressing table lamps.

B. The Character of Lamp Shades.

Shade linings must be white, ivory or a very pale tint. Color on the inside of the shade absorbs light wastefully as a blotter does ink. Slantsided shades aid in spreading the light over a wider area although they are not always decoratively suitable. Shades for floor and table lamps utilizing fluorescent tubes can be greatly reduced in depth, and may therefore have desirable large lower diameters without appearing too heavy and over-scaled. Open-top shades allow interesting highlight on pictures and wall treatments and

provide a kinder-to-the eyes distribution of light. A series of shallow louvers attached to the upper ring or a thin silk or plastic covering is often necessary to avoid seeing the lamp's "mechanics" from standing positions. Shades must have sufficient density that they do not stand out as bright spots against their background. However, shades through which no light is transmitted (opaque) have specialized application provided all comfort factors are considered.

C. Placement of Lamps.

Since light falls off very rapidly with distance, all portable lamps must be placed close to whatever is to be seen, in fact, within 24 to 30 inches. Thus a table lamp placed in the center of a large table can only serve for decoration; it can never satisfactorily serve a chair placed three to four feet away from it. The type lamp—floor, table, or wall—selected for a given grouping should be the one which, with decorative fitness and with the good lighting abilities discussed, brings the light nearest the user. Swivel and extension arms are very advantageous in this latter regard especially at large desks, sewing tables, and with broad-armed chairs.

Lamps used for sewing, writing, or other handwork should be placed on the side opposite the hand used so that the hand will not cast its shadow over the work. (Shadows are greatly minimized with lamps using diffusing bowls or fluorescent tubes and when overhead lighting is used in conjunction with lamps.)

Floor lamps usually need be placed toward the *rear side* of the chair or davenport for which they are selected, so that the person seated there cannot see up under the shade. Lamps should not be placed directly in front of a person, which is too often done on desks—nor should they be placed directly behind the user. Secretary and tilt-top desks require floor lamps—either the small-scale bridge or larger swivel types depending on the desk size.

Davenports placed flat against a wall with no tables to accommodate lamps are served best by floor lamps of the shorter dimensions given since the wall prevents placement far enough to the rear for comfort. Swivel-arm floor lamps serve spinet and miniature pianos, though a taller floor lamp placed close to the keyboard is better for upright or grand pianos.

Dressing table lamps should be placed about 30 inches apart for good make-up light. Shades should be near white and at face height. Wall lamps over beds should be hung with not more than 26 inches between the mattress top and the bottom of the shade.

Torchieres do not give sufficient down lighting for critical seeing. They serve best for soft background lighting, especially in halls, dining rooms, and game rooms.

A relatively balanced placement of lamps within a room—one wall with another—develops the most pleasing effect. Note the illustrations on the following pages for further suggestions.



FIG. 12—Consideration of evening guests is shown and architectural emphasis gained by entrance and house number lighting. A variation from conventional brackets, the recessed light illuminates path, step, and visitor.



FIG. 13—Hospitality carries over into the entrance hallway with appropriate selection of lighting elements for decoration and personal flattery as for safe lighting of stairway. Note night light which marks top stair.



FIG. 14—Cross-lighting of the mirrored fireplace adds glamor to flower arrangement. Indirect lighting from corner pillars complement lamps or provide low conversational lighting.



FIG. 15—Balanced treatment suggests matching chair lamps. Swivel-arm type allows low or reading-light levels. Blended by inbuilt mantle lighting for plant and picture vibrance.



FIG. 16—The wall-to-wall wood strip backed by straw-colored lumiline lamps for sunny effect suffuses the wall and ceiling with soft yet accentuating lighting, and adds space in illusion.



FIG. 17—Large window areas become important light sources at night as by day with lighted valance treatment—a "natural" way of augmenting the light from lamps at specific groupings.



FIG. 18—The luminous wall and one opposite it (treated similarly with fluorescent tubes) shed light flattering throughout room, create by themselves an enchanting social atmosphere and in combination with portable lamps, a comfortable background for eye activity.



FIG. 19—The open planning of this foyer-living room is developed architecturally so that the foyer ceiling carries through into the living room and forms a continuous trough as a natural lighting element. Local seeing conditions might be improved by different lamp choice.



FIG. 20—Soft overall room lighting from the semi-indirect fixture may be spelled, for more formal entertaining, by dramatic downlighting from the two ceiling spotlights.

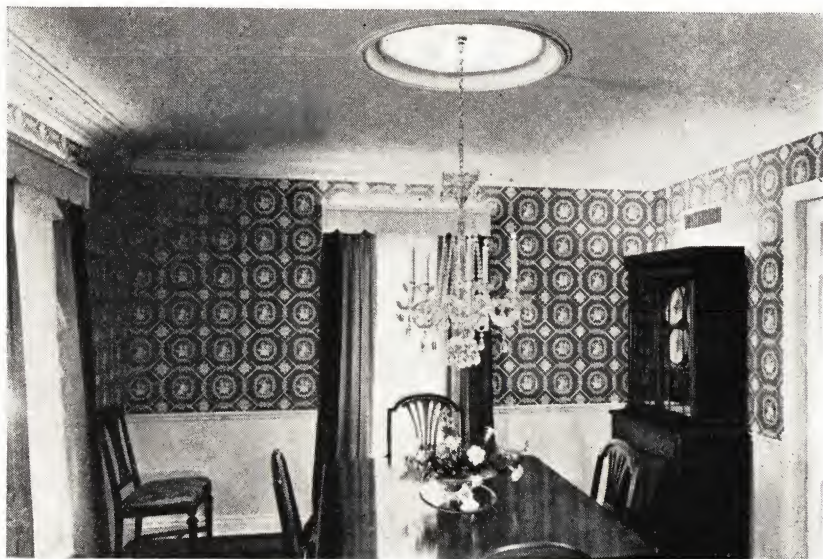


FIG. 21—The brilliance, grace, and traditional beauty of the crystal fixture are retained, but the variability and smoothness of contemporary lighting is added by inbuilt lighting over cabinet, windows, and in the recessed dome.



FIG. 22—Silvered-bowl fixture combined with cabinet inset and window-length sink light for work lighting that is labor-saving too.



FIG. 23—The newest in kitchen fixtures combined with planned lighting over important work centers and freshness of decoration for outdoor effects.



FIG. 24—Flexibility of lighting when wanted also offers opportunity to bring entire kitchen breakfast-nook space into almost shadow free light for efficient, happy functional use of the room.



FIG. 25—Bed-room, living-room, work-room, lighted to serve each purpose. The mirror's seeming side frame of light; the bed-side lamps of suitable height; tubular light at desk, (under clock); bridge lamp by easy chair, each for local use. Center fixture brings room units together.



FIG. 26—Dressing table offers clearness of seeing with overhead fixture, directly above table, and lamps at face height flanking mirror. Center fixture gives light for passage about room, with lamp on bedside table for short period use.

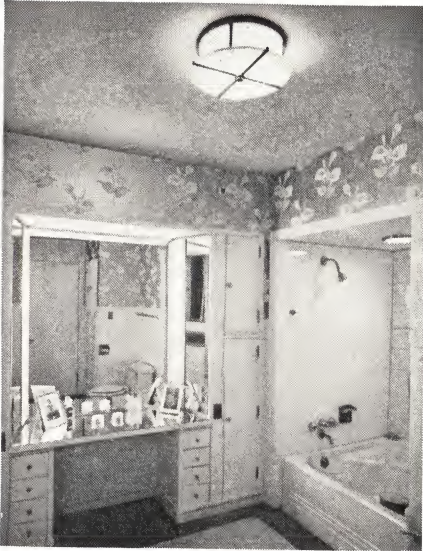


FIG. 27—Clear seeing at mirror provided by side and overhead lights. Sunken, waterproof unit for tub and shower. General lighting from ceiling fixture to complete ease of seeing.



FIG. 28—Two sources of light, a fluorescent ceiling fixture and fluorescent tubes against walls of high reflection at both sides of mirror create good background for toiletry.



FIG. 29—Very light walls, light floor, white finish of the laundry equipment help in thorough distribution of the lighting from silvered bowl lamps housed in reflectors.



FIG. 30—High footcandles from fluorescent tubes in ceiling fixture, at sewing machine and beneath opal glass cutting-panel for home sewing-room efficiency.



FIG. 31—Fluorescent tubes, in industrial reflectors for two home workshops, the laundry and carpentry bench give lighting for safety and quick seeing.

PART V—ADEQUATE WIRING IS ESSENTIAL

The convenient, smooth and satisfactory fulfillment of the lighting recommendations set forth in the preceding sections is entirely dependent upon adequate wiring. Although the wiring installations must precede that of the lighting in the normal building process, it can be intelligently specified only after the carefully thought-out lighting and complete electrical plan has been developed.

The National Adequate Wiring Bureau at 155 East 44th Street, New York City will furnish complete information on service entrance requirements, branch circuits, wire sizes, and placement of outlets and switches.

Conclusion

This publication cannot possibly answer all lighting questions. For further information and more detailed answers to your specific wiring and lighting problems consult those qualified to offer such service in your city.

Respectfully submitted,

MARY DODDS

MARY E. WEBBER

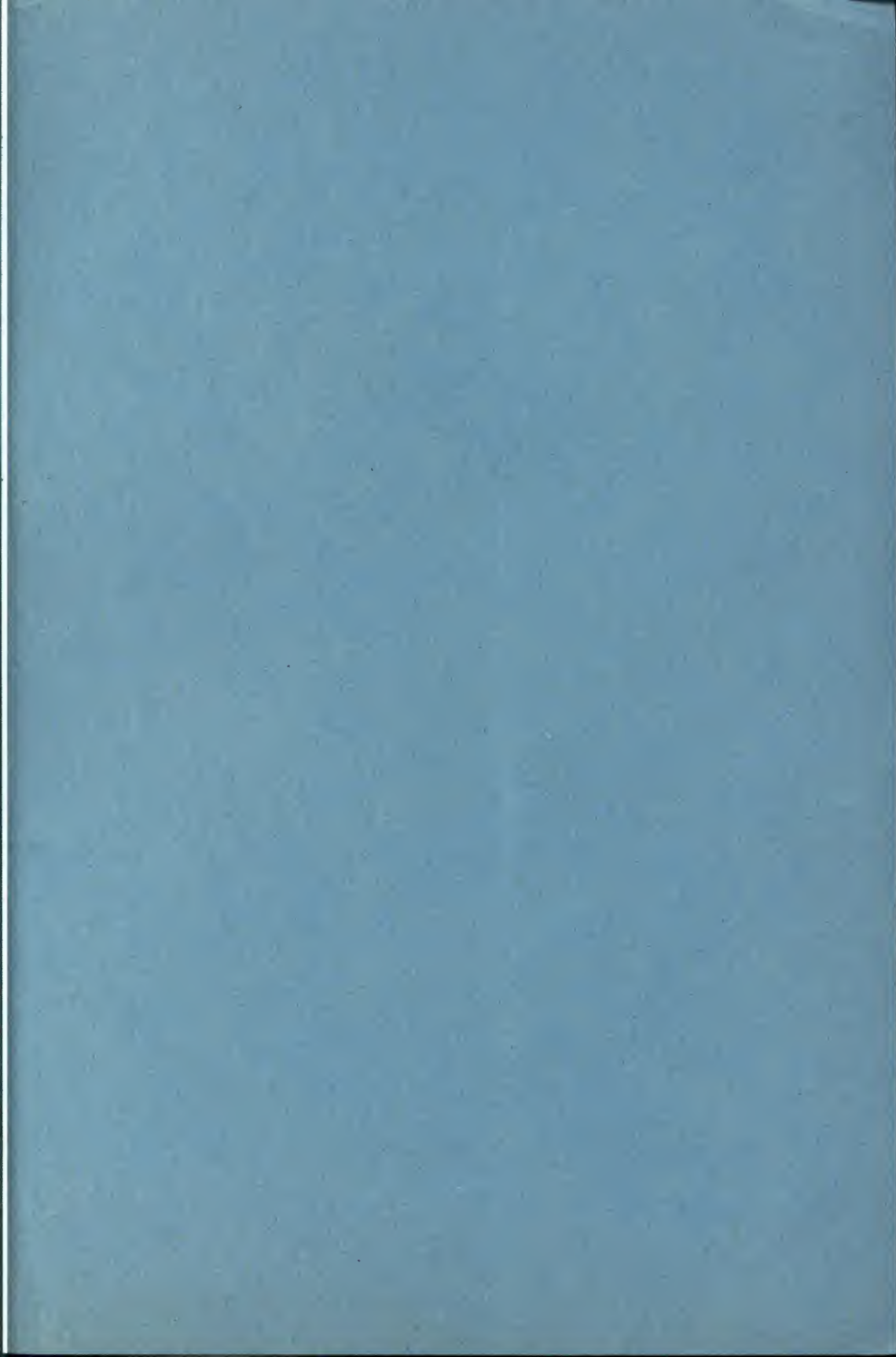
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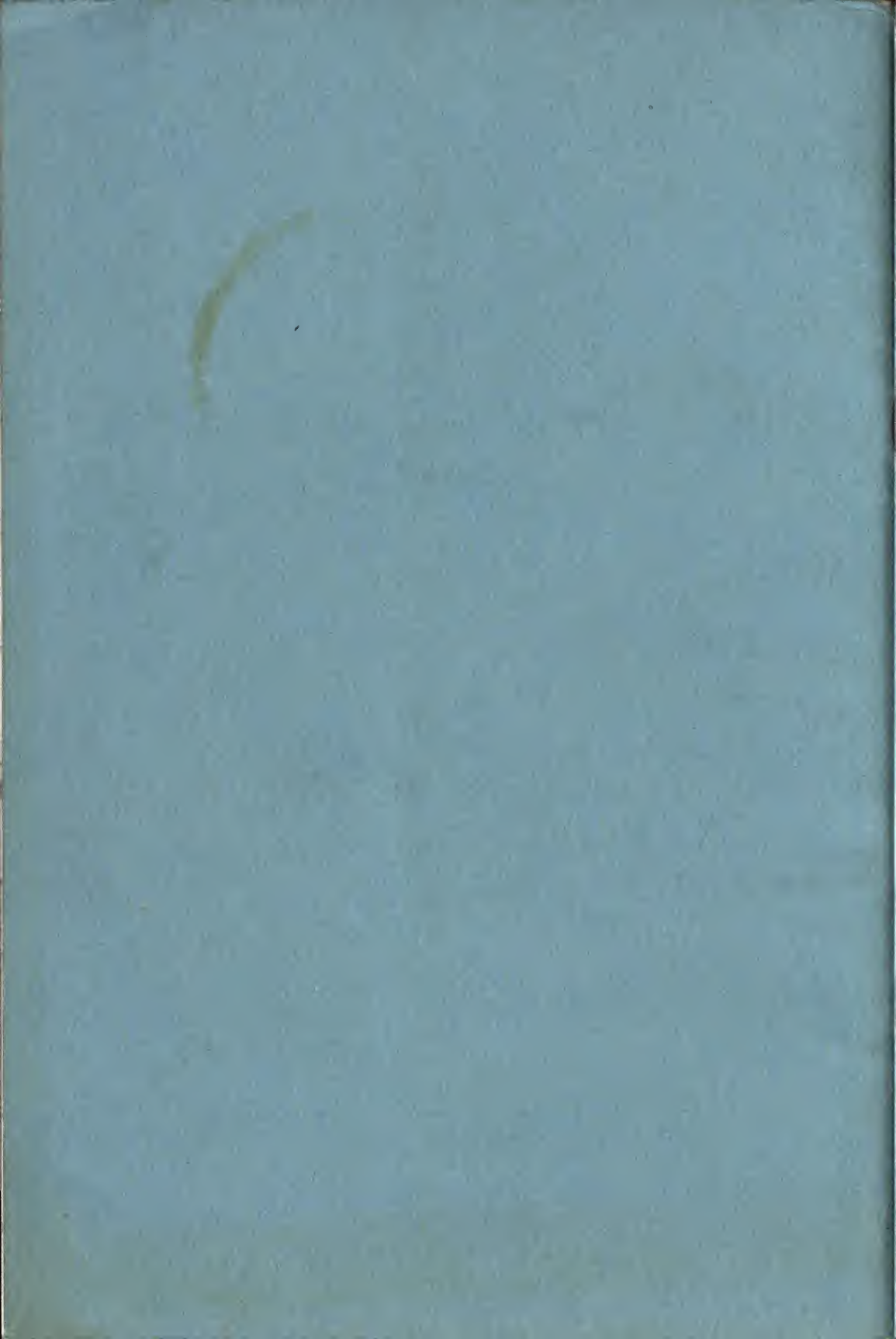
Sub-Committee on Recommended Practice of Home Lighting

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